REMARKS

Please reconsider the application in view of the above amendments and the following remarks. Applicant thanks the Examiner for carefully considering this application.

I. Disposition of Claims

Claims 1, 4-6 are pending in this application. Claim 1 is independent. The remaining claims depend, directly or indirectly, from claim 1. Claims 1 and 6 have been amended in this reply to correct typographical errors.

Particularly, with respect to claim 6, the units of the permeable flux rate have been changed from "$cm^3/m^2 \cdot d$" to "$m^3/m^2 \cdot d$." Thus, the magnitude of the permeable flux rate has been changed in the order of one million, *i.e.*, "centi" being one hundred, ($100^3 = 100 \times 100 \times 100 = 1{,}000{,}000$). This amendment is fully supported by the specification. In fact, throughout the instant specification, a permeable flux rate is referenced in units of "$m^3/m^2 \cdot d$," *e.g.*, please see pp. 3, 5, and 8 of the specification. The Applicant thanks the Examiner for indicating the error in the units of the permeable flux rate recited in claim 6.

II. Rejection(s) under 35 U.S.C § 103

Claims 1 and 6 were rejected under 35 U.S.C. § 103(a) as being obvious over U.S. Patent No. 4,353,802 ("Hara"). This rejection is respectfully traversed.

The present invention advantageously provides, in one or more embodiments, a membrane, which removes toxic substances at low pressures, and further, retards the deposition of insoluble ingredients within a high recovery rate (*i.e.*,

permeable water quantity/supplied water quantity).

Claim 1 recites, "A highly permeable composite reverse osmosis membrane comprising: a thin film containing an amino group directly connected to an aromatic ring and a microporous support to support the thin film; wherein the thin film is formed through an interfacial polymerization by reacting a polyvinyl alcohol-based amine compound, and wherein the highly permeable composite reverse osmosis membrane having a salt rejection of *no more than 80%* as assessed with a pH 6.5 aqueous solution comprising 500 mg/liter of sodium chloride at an operation pressure of 5 kg/cm^2 and at a temperature of 25°C," (emphasis added). The evaluation of the membrane under the claimed testing conditions recited above specifically lends to a membrane having the previously mentioned advantages (*e.g.*, high recovery at low pressures and retardation of depositions of insoluble ingredients, *etc.*).

Hara teaches a semi-permeable composite membrane with high permeselectivity and flux, superior flexibility, high resistance to compaction, high resistance to chemical and biological degradation, excellent storability in dry state and superior dry-wet reversibility. (*See* col. 2, ll. 47-52). In other words, Hara teaches a highly permeable membrane, which is very resilient.

Hara specifically teaches a membrane having a high salt rejection, particularly in excess of 90% (*see* Tables 1-7). Such a high salt rejection expressly teaches away from the claimed invention, because rejecting more than 80% of the salts results in the surface of the membrane being clogged at low pressures (see, *e.g.*, p. 3 of the instant specification). Advantageously, the use of low pressures reduces the costs of running and treating water; however, at low pressures having a high recovery rate tends to clog the

membrane. Therefore, the salt rejection ranges taught by Hara (*i.e.*, greater than 90%) are clearly greater than the claimed range of "no more than 80%" and teach in opposition to the present invention.

Furthermore, Hara states, "The amino compound of the formula (II-a) is preferable from a viewpoint that it is useful to obtain the membrane with a *higher* salt-rejection," (col. 13, ll. 30-33). Therefore, Hara teaches how to increase the salt rejection, rather than decrease (or "controlling") the salt rejection to "no more than 80%," as required by claim 1.

Because Hara does not teach a membrane having a salt rejection rate of no more than 80%, claim 1 is patentable over Hara. Thus, claims 4-6 being dependent, directly or indirectly, are likewise patentable for at least the same reasons.

Claims 1 and 4-6 were rejected under 35 U.S.C. §103(a) as being unpatentable over Hara in view of U.S. Patent No. 5, 576,057 ("Hirose"). Hirose fails to provide that which Hara lacks.

Hirose teaches a composite reverse osmosis membrane coated by two solutions, where the difference in solubility between the two solutions is in the range of 7 to 15 $(cal/cm^3)^{1/2}$.

Similar to Hara, Hirose expressly teaches away from a salt rejection, which is no more than 80%. As shown by Table of 1, the inventive salt rejection ranges from 99.4%-99.6%. Hirose does not discuss "controlling" the salt rejection to no more than 80%, so as to prevent clogging in the membrane. The Applicant respectfully notes that the entry in Table 1 showing a 10% salt rejection rate is a non-aqueous solution (*i.e.*, 0% of water present in solution A), where claim 1 requires the membrane to be "assessed with a pH

6.5 *aqueous* solution." In fact, in aqueous solutions of Table 1, the membrane as taught by Hirose maintains a salt rejection of no *less* than 99.4%, which clearly exceeds the claimed range of no more than 80%.

Therefore, Hirose cannot render claim 1 obvious, because Hirose does not teach a salt rejection rate of no more than 80%, as recited in claim 1. Because Hirose fails to provide that which Hara lacks, claim 1 is patentable over Hara and Hirose, whether considered separately or in combination. Claims 4-6 being dependent, directly or indirectly, are likewise patentable for at least the same reasons.

III. Concluding Remarks

Applicant believes this reply to be fully responsive to all outstanding issues and place this application in condition for allowance. If this belief is incorrect, or other issues arise, do not hesitate to contact the undersigned or his associates at the telephone number listed below. Please apply any charges not covered, or any credits, to Deposit Account 50-0591 (Reference Number 04558.35002).

Respectfully submitted,

Date: 8/7/03

#45,079

Jonathan P. Osha, Reg. No. 33,986
Rosenthal & Osha L.L.P.
One Houston Center, Suite 2800
1221 McKinney Street
Houston, TX 77010
Telephone: (713) 228-8600
Facsimile: (713) 228-8778

50751_1